

In re Patent Application of:
MOREAUX ET AL.
Serial No. 10/060,105
Filing Date: January 29, 2002

In the Claims:

Claims 1 to 8 (Previously Cancelled).

9. (Previously Added) A detection device for detecting a defective power supply connection in an integrated circuit comprising at least one internal power supply line, at least one power supply pad connected to the at least one internal power supply line and to be connected to an external device for receiving an external voltage, at least one input/output pad to be connected to the external device for receiving the external voltage, and a pull-up or pull-down device connected between the at least one input/output pad and the at least one internal power supply line, the detection device comprising:

a detection circuit for comparing voltage levels between the at least one input/output pad and the at least one internal power supply line for determining if the power supply connection with the external device is defective.

10. (Previously Added) A detection device according to Claim 9, wherein said detection circuit comprises at least one comparison circuit for each power supply pad.

11. (Previously Added) A detection device according to Claim 9, wherein said detection circuit comprises a comparison circuit connected between each respective power supply pad and a corresponding input/output pad.

12. (Previously Added) A detection device according

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to Claim 11, wherein each comparison circuit comprises a first inverter having an input connected to the at least one internal power supply line, and another input connected to the at least one input/output pad for receiving power therefrom.

13. (Previously Added) A detection device according to Claim 12, wherein said first inverter comprises at least one transistor having a low threshold; and wherein an output of said first inverter changes when a difference in voltage levels on the at least one internal power supply line and the at least one input/output pad is at least equal to the low threshold of said at least one transistor.

14. (Previously Added) A detection device according to Claim 12, wherein each comparison circuit comprises a second inverter series connected with said first inverter, said second inverter having an output for providing a defective connection signal based upon a difference in the compared voltage levels.

15. (Previously Added) A detection device according to Claim 9, wherein said detection circuit generates a defective connection signal for turning off at least a portion of the integrated circuit when a difference in the compared voltage levels exceeds a threshold.

16. (Previously Added) An integrated circuit comprising:
at least one internal power supply line;

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at least one power supply pad connected to said at least one internal power supply line, and to be connected to an external device for receiving an external voltage;

at least one input/output pad to be connected to the external device for receiving the external voltage;

at least one of a pull-up and pull-down device connected between said at least one input/output pad and said at least one internal power supply line; and

a detection circuit for comparing voltage levels between said at least one input/output pad and said at least one internal power supply line for determining if a power supply connection with the external device is defective.

17. (Previously Added) An integrated circuit according to Claim 16, wherein said detection circuit comprises a comparison circuit connected between each respective power supply pad and a corresponding input/output pad.

18. (Previously Added) An integrated circuit according to Claim 17, wherein each comparison circuit comprises a first inverter having an input connected to said at least one internal power supply line, and another input connected to said at least one input/output pad for receiving power therefrom.

19. (Previously Added) An integrated circuit according to Claim 18, wherein said first inverter comprises at least one transistor having a low threshold; and wherein an output of said first inverter changes when a difference in

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voltage levels on said at least one internal power supply line and said at least one input/output pad is at least equal to the low threshold of said at least one transistor.

20. (Previously Added) An integrated circuit according to Claim 18, wherein each comparison circuit comprises a second inverter series connected with said first inverter, said second inverter having an output for providing a defective connection signal based upon a difference in the compared voltage levels.

21. (Previously Added) An integrated circuit according to Claim 16, wherein said detection circuit generates a defective connection signal for turning off at least a portion of the integrated circuit when a difference in the compared voltage levels exceeds a threshold.

22. (Previously Added) A smart card comprising:
at least one internal power supply line;
at least one power supply pad connected to said at least one internal power supply line, and to be connected to a card reader for receiving an external voltage;
at least one input/output pad to be connected to the card reader for receiving the external voltage;
at least one of a pull-up and pull-down device connected between said at least one input/output pad and said at least one internal power supply line; and
a detection circuit for comparing voltage levels between said at least one input/output pad and said at least

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one internal power supply line for determining if a power supply connection with the card reader is defective.

23. (Previously Added) A smart card according to Claim 22, wherein said detection circuit comprises a comparison circuit connected between each respective power supply pad and a corresponding input/output pad.

24. (Previously Added) A smart card according to Claim 23, wherein each comparison circuit comprises a first inverter having an input connected to said at least one internal power supply line, and another input connected to said at least one input/output pad for receiving power therefrom.

25. (Previously Added) A smart card according to Claim 24, wherein said first inverter comprises at least one transistor having a low threshold; and wherein an output of said first inverter changes when a difference in voltage levels on said at least one internal power supply line and said at least one input/output pad is at least equal to the low threshold of said at least one transistor.

26. (Previously Added) A smart card according to Claim 24, wherein each comparison circuit comprises a second inverter series connected with said first inverter, said second inverter having an output for providing a defective connection based upon the difference in voltage levels.

27. (Previously Added) A smart card according to

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Claim 22, wherein said detection circuit generates a defective connection signal for turning off at least a portion of the smart card when a difference in the compared voltage levels exceeds a threshold.

28. (Previously Added) A method for detecting a defective power supply connection in an integrated circuit comprising at least one internal power supply line, at least one power supply pad connected to the at least one internal power supply line, at least one input/output pad, and a pull-up or pull-down device connected between the at least one input/output pad and the at least one internal power supply line, the method comprising:

providing an external voltage to the at least one power supply pad and to the at least one input/output pad; and

comparing voltage levels between the at least one input/output pad and the at least one internal power supply line for determining if the power supply connection with the external device is defective.

29. (Previously Added) A method according to Claim 28, wherein the comparing is performed for each power supply pad.

30. (Previously Added) A method according to Claim 28, wherein the comparing is performed by a comparison circuit connected between each respective power supply pad and a corresponding input/output pad, and wherein each comparison circuit comprises a first inverter having an input connected to the at least one internal power supply line, and another

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input connected to the at least one input/output pad for receiving power therefrom.

31. (Previously Added) A method according to Claim 30, wherein the first inverter comprises at least one transistor having a low threshold; and wherein an output of the first inverter changes when a difference in voltage levels on the at least one internal power supply line and the at least one input/output pad is at least equal to the low threshold of the at least one transistor.

32. (Previously Added) A method according to Claim 30, wherein each comparison circuit comprises a second inverter series connected with the first inverter, the second inverter having an output for providing a defective connection based upon a difference in the compared voltage levels.

33. (Previously Added) A method device according to Claim 28, further comprising generating a defective connection signal for turning off at least a portion of the integrated circuit when a difference in the compared voltage levels exceeds a threshold.